

SOLAR/1013-79/02

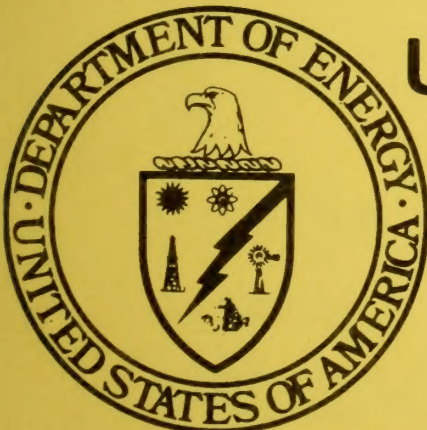
Monthly Performance Report



J. D. EVANS

HOUSE B

FEBRUARY 1979



U.S. Department of Energy

National Solar Heating and
Cooling Demonstration Program

National Solar Data Program

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MONTHLY PERFORMANCE REPORT

J. D. EVANS, INC.
HOUSE B

FEBRUARY 1979

I. SYSTEM DESCRIPTION

J. D. Evans, Inc., House B is one of two instrumented single-family residences in Columbia, Maryland. The home has approximately 2250 square feet of conditioned space. Solar energy is used for space heating the home and preheating domestic hot water (DHW). The solar energy system has an array of flat-plate collectors with a gross area of 374 square feet. The array faces south at an angle of 45 degrees to the horizontal. Water is the transfer medium that delivers solar energy from the collector array to storage and to the space heating and hot water loads. Solar energy is stored in the basement in a 1000-gallon steel storage tank. Incoming city water is preheated in a liquid-to-liquid heat exchanger located in the storage tank and then flows into a conventional 40-gallon DHW tank. When solar energy is insufficient to satisfy the space heating load, a heat exchanger within a heat pump and an electrical heating element in the air-distribution duct provides auxiliary energy for space heating. Similarly, an electrical heating element in the DHW tank provides auxiliary energy for water heating. The system, shown schematically in Figure 1, has three modes of solar operation.

Mode 1 - Collector-to-Storage: This mode activates when the temperature difference between the storage tank and the collector outlet is higher than 15°F. Water circulates from the storage tank through the collector until a temperature difference of less than 5°F is reached.

Mode 2 - Storage-to-Space Heating: This mode activates when thermal energy for space heating is requested by the room thermostat. Solar-heated water from storage circulates through a liquid-to-air heat exchanger in the space heating air duct. If solar energy is insufficient to satisfy the space heating load, the heat pump and/or the auxiliary electrical heating element will be activated. The electrical strip heater can also be manually operated without solar heating and heat pump operation.

Mode 3 - DHW Preheating: This mode is activated by drawing hot water from the system. Cold supply water is preheated in a liquid-to-liquid heat exchanger located in the solar energy storage tank before flowing to the DHW tank. If the required DHW tank temperature of 140°F is not maintained by solar preheating, auxiliary energy is provided by the electrical heating element in the DHW tank.

II. PERFORMANCE EVALUATION

INTRODUCTION

The site was occupied in February and the solar energy system operated continuously during the month. Solar energy satisfied 6 percent of the space heating

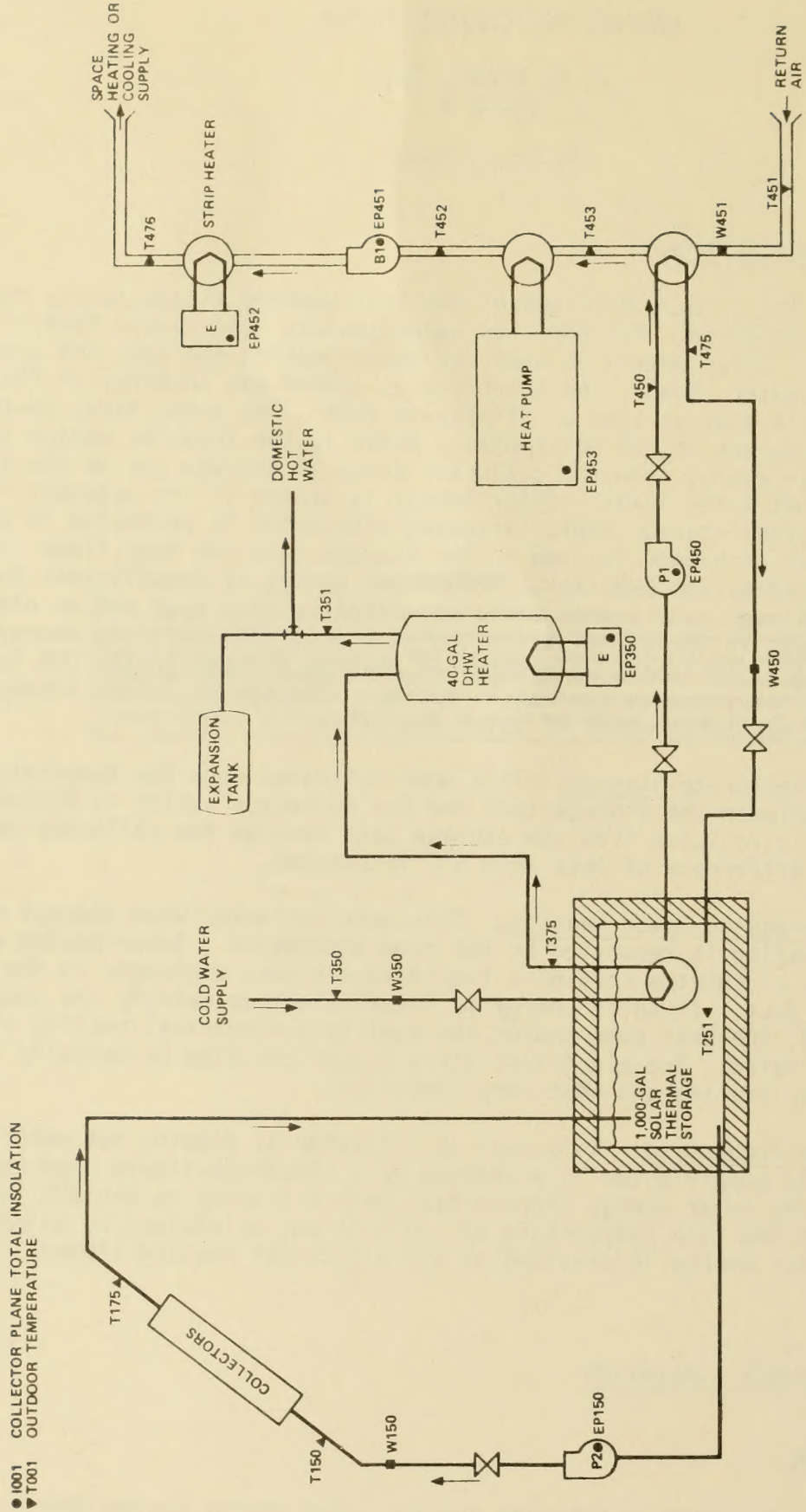


Figure 1. J. D. EVANS, INC., HOUSE B SOLAR ENERGY SYSTEM SCHEMATIC

requirements. Solar fraction of the DHW load and DHW auxiliary electrical energy were not determined because of problems with the DHW auxiliary energy sensor. The solar energy system provided electrical savings of 1.3 million Btu. No data was collected during the first 13 days of the month. The Site Data Acquisition Subsystem (SDAS) was repaired and put back into operation on February 13.

WEATHER CONDITIONS

During the month, total incident solar energy on the collector array was 9.7 million Btu for a daily average of 925 Btu per square foot. This was below the estimated average daily solar radiation for this geographical area during February of 1205 Btu per square foot for a south-facing plane with a tilt of 45 degrees to the horizontal. The average ambient temperature during February was 26°F as compared with the long-term average for February of 35°F.

THERMAL PERFORMANCE

Collector - The total incident solar radiation on the collector array for the month of February was 9.7 million Btu. During the period the collector loop was operating the total insolation amounted to 6.9 million Btu. The total collected solar energy for the month of February was 2.1 million Btu, resulting in a collector array efficiency of 22 percent, based on total incident insolation. Solar energy delivered from the collector array to storage was 2.1 million Btu. Operating energy required by the collector loop was 0.062 million Btu.

Storage - Solar energy delivered to storage was 2.1 million Btu. There were 1.6 million Btu delivered from storage to the DHW and space heating subsystems. Energy loss from storage was 0.24 million Btu. This loss represented 11 percent of the energy delivered to storage. The storage efficiency was 89 percent: This is calculated as the ratio of the sum of the energy removed from storage and the change in stored energy, to the energy delivered to storage. The average storage temperature for the month was 105°F.

DHW Load - The DHW subsystem consumed 0.64 million Btu of solar energy and an undetermined amount of auxiliary energy to satisfy a hot water load of 1.5 million Btu. The auxiliary electrical energy consumed was not determined because of sensor problems. The DHW subsystem consumed no operating energy, resulting in an electrical energy savings of 0.64 million Btu. A daily average of 79 gallons of DHW was consumed at an average temperature of 120°F delivered from the tank.

Space Heating Load - The space heating subsystem consumed 0.95 million Btu of solar energy and 9.6 million Btu of auxiliary electrical energy to satisfy a space heating load of 17.2 million Btu. The heat pump supplied a load of 14.4 million Btu. The solar fraction of the space heating load was 6 percent. The space heating subsystem consumed a total of 0.82 million Btu of operating energy, resulting in an electrical energy savings of 0.72 million Btu. The average ambient temperature inside the house was 68°F.

OBSERVATIONS

No data was collected during the first 13 days of the month. The SDAS was repaired and put back into operation on February 13. Data was collected and processed from February 13 to the end of the month. The net loss of collected solar energy on February 13 was caused by the forced system operation at low incident radiation for systems test.

ENERGY SAVINGS

The solar energy system provided a net electrical energy savings of 1.3 million Btu. The DHW subsystem provided an electrical energy savings of 0.64 million Btu, while the space heating subsystem contributed an electrical energy savings of 0.72 million Btu.

III. ACTION STATUS

Boeing is expected to investigate the DHW electrical heater power sensor.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT SITE SUMMARY

SITE: J.D. EVANS, INC. HOUSE B, COLUMBIA, MARYLAND
REPORT PERIOD: FEBRUARY, 1979

SOLAR/1013-79/02

SITE/SYSTEM DESCRIPTION: THE INSTALLATION CONSISTS OF TWO ADJACENT BUT SEPARATE RESIDENCES USING A SINGLE J-BOX AND SOAS. THE TWO HOUSES HAVE IDENTICAL AND INDEPENDENT SOLAR ASSISTED SYSTEMS. A LIQUID COLLECTOR TRANSFERS SOLAR HEAT TO A 1000 GALLON STORAGE TANK. A HEAT EXCHANGER IN THE STORAGE TANK PREHEATS DOMESTIC HOT WATER. STORAGE WATER IS CIRCULATED TO AN INDUCTIVE HEAT EXCHANGER FOR SPACE HEATING. RESISTANCE HEATING AND A HEAT PUMP, WHICH SUPPLIES SOME HEAT AND ALL COOLING, COMPLETE THE SYSTEM. ALL AUXILIARY ENERGY USED IS ELECTRIC.

GENERAL SITE DATA:

INCIDENT SOLAR ENERGY	9.689	MILLION BTU
	25906	BTU/SQ. FT.
	2.081	MILLION BTU
	5564	BTU/SQ. FT.
	26	DEGREES F
	68	DEGREES F
	0.16	MILLION BTU
	0.062	MILLION BTU
	0.885	MILLION BTU
	*	

COLLECTED SOLAR ENERGY

AVERAGE AMBIENT TEMPERATURE
AVERAGE BUILDING TEMPERATURE
ECSS SOLAR CONVERSION EFFICIENCY
ECSS OPERATING ENERGY
TOTAL SYSTEM OPERATING ENERGY
TOTAL ENERGY CONSUMED

SUBSYSTEM SUMMARY:

LCAD	HOT	WATER	HEATING	COOLING	SYSTEM TOTAL
SOLAR FRACTION USED	1.446	*	17.220	N.A.	18.661
SOLAR ENERGY USED	0.636	*	0.951	N.A.	1.587
OPERATING ENERGY	N.A.	*	0.823	N.A.	0.885
AUX. THERMAL ENERGY	*	*	7.263	N.A.	*
AUX. ELECTRIC FUEL	N.A.	*	9.556	N.A.	N.A.
AUX. FOSSIL FUEL	0.636	*	N.A.	N.A.	1.290
ELECTRICAL SAVINGS	N.A.	*	0.717	N.A.	N.A.
FOSSIL SAVINGS			N.A.	N.A.	

SYSTEM PERFORMANCE FACTOR:

* DENOTES UNAVAILABLE DATA
@ DENOTES NULL DATA
N.A. DENOTES NOT APPLICABLE DATA

REFERENCE: USER'S GUIDE TO THE MONTHLY PERFORMANCE REPORT
OF THE NATIONAL SOLAR DATA PROGRAM, FEBRUARY 28, 1979,
SOLAR/0004-78/18

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT SITE SUMMARY

SITE: J.O. EVANS, INC. HOUSE B, COLUMBIA, MARYLAND
REPORT PERIOD: FEBRUARY, 1979

SOLAR/1013-79/02

SITE/SYSTEM DESCRIPTION: THE TWO ADJACENT BUT SEPARATE RESIDENCES USING THE INSTALLATION CONSISTS OF TWO HOUSES HAVE IDENTICAL AND INDEPENDENT A SINGLE J-BOX AND SDAS. THE TWO HOUSES HAVE IDENTICAL AND INDEPENDENT SOLAR ASSISTED SYSTEMS. A LIQUID COLLECTOR TRANSFERS SOLAR HEAT TO A 1000 GALLON STORAGE TANK. A HEAT EXCHANGER IN THE STORAGE TANK PREHEATS DOMESTIC HOT WATER. STORAGE WATER IS CIRCULATED TO AN INDUCTIVE HEAT EXCHANGER FOR SPACE HEATING. RESISTANCE HEATING AND A HEAT PUMP, WHICH SUPPLIES SOME HEAT AND ALL COOLING, COMPLETE THE SYSTEM. ALL AUXILIARY ENERGY USED IS ELECTRIC.

GENERAL SITE DATA:

INCIDENT SOLAR ENERGY	10.222	GIGA JOULES
COLLECTED SOLAR ENERGY	294184	KJ/SQ.M.
AVERAGE AMBIENT TEMPERATURE	2.195	GIGA JOULES
AVERAGE BUILDING TEMPERATURE	63180	KJ/SQ.M.
ECSS SOLAR CONVERSION EFFICIENCY	-3	DEGREES C
ECSS OPERATING ENERGY	20	DEGREES C
TOTAL SYSTEM OPERATING ENERGY	0.16	GIGA JOULES
TOTAL ENERGY CONSUMED	0.066	GIGA JOULES
	0.034 *	GIGA JOULES

SUBSYSTEM SUMMARY:

LOAD FRACTION	HEATING	COOLING	SYSTEM TOTAL
SOLAR ENERGY USED	18.167	N.A.	19.687
OPERATING ENERGY	6	N.A.	*
AUX. THERMAL ENG	1.003	N.A.	1.674
AUX. ELECTRIC FUEL	0.868	N.A.	0.934
AUX. FOSSIL FUEL	7.663	N.A.	*
ELECTRICAL SAVINGS	10.082	N.A.	N.A.
FOSSIL SAVINGS	0.756	N.A.	1.361
	N.A.	N.A.	N.A.
	N.A.	N.A.	N.A.

SYSTEM PERFORMANCE FACTOR:

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REFERENCE: USER'S GUIDE TO THE MONTHLY PERFORMANCE REPORT OF THE NATIONAL SOLAR DATA PROGRAM, FEBRUARY 28, 1978, SOLAR/0004-78/18

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT ENERGY COLLECTION AND STORAGE SUBSYSTEM (ECSS)

SITE: J.O. EVANS, INC., HOUSE B, COLUMBIA, MARYLAND

SOLAR/1013-79/02

REPORT PERIOD: FEBRUARY, 1979

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	AMBIENT TEMP DEG-F	ENERGY TO LOADS MILLION BTU	AUX THERMAL TO ECSS MILLION BTU	ECSS OPERATING ENERGY MILLION BTU	ECSS ENERGY REJECTED MILLION BTU	ECSS SOLAR CONVERSION EFFICIENCY
1	*	*	NOT APPLICABLE	NOT APPLICABLE	*	NOT APPLICABLE	*
2	*	*	NOT APPLICABLE	NOT APPLICABLE	*	NOT APPLICABLE	*
3	*	*	NOT APPLICABLE	NOT APPLICABLE	*	NOT APPLICABLE	*
4	*	*	NOT APPLICABLE	NOT APPLICABLE	*	NOT APPLICABLE	*
5	*	*	NOT APPLICABLE	NOT APPLICABLE	*	NOT APPLICABLE	*
6	*	*	NOT APPLICABLE	NOT APPLICABLE	*	NOT APPLICABLE	*
7	*	*	NOT APPLICABLE	NOT APPLICABLE	*	NOT APPLICABLE	*
8	*	*	NOT APPLICABLE	NOT APPLICABLE	*	NOT APPLICABLE	*
9	*	*	NOT APPLICABLE	NOT APPLICABLE	*	NOT APPLICABLE	*
10	*	*	NOT APPLICABLE	NOT APPLICABLE	*	NOT APPLICABLE	*
11	0.148	12	NOT APPLICABLE	NOT APPLICABLE	0.001	0.003	0.129
12	0.422	11	NOT APPLICABLE	NOT APPLICABLE	0.000	0.000	0.034
13	0.060	17	NOT APPLICABLE	NOT APPLICABLE	0.000	0.000	0.022
14	0.151	23	NOT APPLICABLE	NOT APPLICABLE	0.000	0.000	0.152
15	0.944	7	NOT APPLICABLE	NOT APPLICABLE	0.005	0.004	0.019
16	0.100	6	NOT APPLICABLE	NOT APPLICABLE	0.000	0.000	0.394
17	0.662	23	NOT APPLICABLE	NOT APPLICABLE	0.004	0.006	0.102
18	0.719	22	NOT APPLICABLE	NOT APPLICABLE	0.000	0.000	0.278
19	0.075	32	NOT APPLICABLE	NOT APPLICABLE	0.000	0.000	0.379
20	0.724	40	NOT APPLICABLE	NOT APPLICABLE	0.000	0.000	1.062
21	0.105	35	NOT APPLICABLE	NOT APPLICABLE	0.000	0.000	0.062
22	0.178	39	NOT APPLICABLE	NOT APPLICABLE	0.000	0.000	0.172
23	0.054	36	NOT APPLICABLE	NOT APPLICABLE	0.000	0.000	0.374
24	0.040	36	NOT APPLICABLE	NOT APPLICABLE	0.000	0.000	0.275
25	0.040	36	NOT APPLICABLE	NOT APPLICABLE	0.000	0.000	0.368
26	0.454	40	NOT APPLICABLE	NOT APPLICABLE	0.003	0.007	0.047
27	0.801	40	NOT APPLICABLE	NOT APPLICABLE	0.007	0.007	0.078
28	0.801	40	NOT APPLICABLE	NOT APPLICABLE	0.007	0.007	0.078
SUM	9.689	-	N.A.	N.A.	0.062	N.A.	-
AVG	0.346	26	N.A.	N.A.	0.002	N.A.	0.164
NBS ID	Q001	N113			Q102		N111

* DENOTES UNAVAILABLE DATA.

@ DENOTES NULL DATA.

N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT COLLECTOR ARRAY PERFORMANCE

SITE: J.D. EVANS, INC. HOUSE B, COLUMBIA, MARYLAND SOLAR/1013-79/02
REPORT PERIOD: FEBRUARY, 1979

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	OPERATIONAL INCIDENT ENERGY MILLION BTU	COLLECTED SOLAR ENERGY MILLION BTU	DAYTIME AMBIENT TEMP DEG F	COLLECTOR ARRAY EFFICIENCY
1	*	*	*	*	*
2	*	*	*	*	*
3	*	*	*	*	*
4	*	*	*	*	*
5	*	*	*	*	*
6	*	*	*	*	*
7	*	*	*	*	*
8	*	*	*	*	*
9	*	*	*	*	*
10	*	*	*	*	*
11	0.1428	0.0285	-0.0044	16	-0.0229
12	0.0600	0.0285	0.0822	18	0.1955
13	0.0600	0.0000	0.0000	19	0.0000
14	0.1511	0.0000	0.0000	21	0.0000
15	0.0944	0.0769	0.2000	18	0.2111
16	0.1000	0.0000	0.0000	8	0.0000
17	0.0662	0.4955	0.1499	28	0.2225
18	0.0719	0.6399	0.2022	34	0.2811
19	0.0724	0.6599	0.0000	36	0.0000
20	0.1055	0.0000	0.2333	48	0.3222
21	0.0788	0.0000	0.0000	39	0.0000
22	0.0544	0.0000	0.0000	39	0.0000
23	0.0400	0.0000	0.0000	41	0.0000
24	0.0454	0.2955	0.0677	37	0.0000
25	0.8011	0.7800	0.2611	38	0.1477
26				*	0.3225
27					
28					
SUM	9.6899	6.9133	2.0811	-	-
AVG	0.3466	0.2477	0.0744	29	0.2155
NBSID	Q001		Q100		N100

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT STORAGE PERFORMANCE

SITE: J.D. EVANS, INC. HOUSE B, COLUMBIA, MARYLAND SOLAR/1013-79/02
REPORT PERIOD: FEBRUARY, 1979

DAY OF MONTH	ENERGY TO STORAGE MILLION BTU	ENERGY FROM STORAGE MILLION BTU	CHANGE IN STORED ENERGY MILLION BTU	STORAGE AVERAGE TEMP DEG F	STORAGE EFFICIENCY
1	*	*	*	*	*
2	*	*	*	*	*
3	*	*	*	*	*
4	*	*	*	*	*
5	*	*	*	*	*
6	*	*	*	*	*
7	*	*	*	*	*
8	*	*	*	*	*
9	*	*	*	*	*
10	*	*	*	*	*
11	0.004	0.019	-0.012	103	-1.627
12	0.082	0.014	-0.058	107	0.882
13	0.000	0.016	-0.031	108	1.000
14	0.000	0.023	-0.021	105	1.000
15	0.200	0.018	-0.166	113	0.920
16	0.000	0.239	-0.163	116	0.000
17	0.000	0.068	-0.063	119	0.876
18	0.149	0.200	-0.051	122	1.064
19	0.202	0.104	-0.097	122	1.000
20	0.000	0.045	-0.045	122	0.893
21	0.233	0.018	-0.163	110	1.000
22	0.000	0.029	-0.036	106	1.000
23	0.000	0.015	-0.019	102	1.000
24	0.000	0.015	-0.022	109	1.000
25	0.000	0.021	-0.045	101	0.994
26	0.067	0.062	0.152	117	0.822
27	0.261	0.062	0.152	117	0.822
28	0.261	0.062	0.152	117	0.822
SUM	2.081	1.587	0.258	-	-
AVG	0.074	0.057	0.009	105	0.887
NBS ID	Q200	Q201	Q202		N108

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM
MONTHLY REPORT
HOT WATER SUBSYSTEM

SITE: J.D. EVANS, INC. HOUSE B, COLUMBIA, MARYLAND
REPORT PERIOD: FEBRUARY, 1979

SOLAR/1013-79/02

DAY OF MON.	HOT WATER LOAD MILLION BTU	SOLAR FR. OF LOAD PER CENT	SOLAR ENERGY USED MILLION BTU	OPER ENERGY MILLION BTU	AUX THERMAL USED MILLION BTU	AUX ELECT FUEL MILLION BTU	AUX FOSSIL FUEL MILLION BTU	ELECT ENERGY SAVINGS MILLION BTU	FOSSIL ENERGY SAVINGS MILLION BTU	SUP. WAT. TEMP DEG F	HOT WAT. TEMP DEG F	HOT WATER USED GAL
1	*	*	*	*	*	*	*	*	*	*	*	*
2	0.043	0.019	0.001	0.014	0.001	0.016	0.001	0.014	0.001	50	120	71
3	0.033	0.014	0.001	0.011	0.001	0.013	0.001	0.011	0.001	52	120	54
4	0.058	0.023	0.002	0.016	0.002	0.018	0.002	0.016	0.002	48	120	90
5	0.053	0.021	0.002	0.015	0.002	0.017	0.002	0.015	0.002	45	120	63
6	0.083	0.031	0.003	0.017	0.003	0.019	0.003	0.017	0.003	45	120	83
7	0.040	0.015	0.001	0.012	0.001	0.014	0.001	0.012	0.001	50	120	58
8	0.104	0.041	0.004	0.015	0.004	0.017	0.004	0.015	0.004	46	120	124
9	0.068	0.029	0.003	0.018	0.003	0.020	0.003	0.018	0.003	47	120	61
10	0.036	0.015	0.001	0.015	0.001	0.017	0.001	0.015	0.001	46	120	56
11	0.041	0.017	0.002	0.015	0.002	0.017	0.002	0.015	0.002	47	120	63
12	0.057	0.021	0.002	0.013	0.002	0.015	0.002	0.013	0.002	48	119	88
13	0.064	0.033	0.003	0.013	0.003	0.015	0.003	0.013	0.003	53	118	96
SUM	1.446	0.636	0.636	N.A.	N.A.	N.A.	N.A.	0.636	N.A.	-	-	2224
AVG	0.052	0.023	0.023	N.A.	N.A.	N.A.	N.A.	0.023	N.A.	49	120	79
NBS	Q302	Q300	Q303	Q301	Q305	Q306	Q311	Q313	Q313	N305	N307	N308

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT SPACE HEATING SUBSYSTEM

SITE: J.D. EVANS, INC. HOUSE B, COLUMBIA, MARYLAND
REPORT PERIOD: FEBRUARY, 1979
SOLAR/1013-79/C2

DAY OF MON.	SPACE HEATING LOAD MILLION BTU	SOLAR FR. OF LOAD PCT	SOLAR ENERGY USED MILLION BTU	OPER ENERGY MILLION BTU	AUX THERMAL MILLION BTU	AUX ELECT MILLION BTU	AUX FOSSIL FUEL MILLION BTU	ELECT SAVINGS MILLION BTU	FOSSIL SAVINGS MILLION BTU	BLDG TEMP DEG. F	AMB TEMP DEG. F
1	0.862	0.000	0.000	0.045	0.319	0.567		0.000		67	27
2	0.826	0.000	0.000	0.045	0.429	0.555		0.000		77	11
3	0.833	0.000	0.000	0.045	0.361	0.498		0.000		67	11
4	0.839	0.000	0.000	0.045	0.323	0.447		0.000		67	12
5	0.827	0.000	0.000	0.045	0.582	0.706		0.000		68	13
6	0.845	0.000	0.000	0.045	0.424	0.521		0.000		67	23
7	0.851	0.000	0.000	0.045	0.419	0.516		0.000		68	22
8	0.850	0.000	0.000	0.045	0.428	0.517		0.000		67	20
9	0.859	0.000	0.000	0.045	0.412	0.515		0.000		68	20
10	0.860	0.000	0.000	0.045	0.496	0.622		0.000		67	23
11	0.833	0.000	0.000	0.045	0.143	0.133		0.000		68	34
12	0.833	0.000	0.000	0.045	0.113	0.201		0.000		68	33
13	0.856	0.000	0.000	0.045	0.161	0.160		0.000		68	33
14	0.842	0.000	0.000	0.045	0.179	0.226		0.000		68	33
15	0.842	0.000	0.000	0.045	0.159	0.225		0.000		68	36
16	0.861	0.000	0.000	0.045	0.078	0.225		0.000		68	34
17	0.861	0.000	0.000	0.045	0.078	0.109		0.015		68	34
18	0.861	0.000	0.000	0.045	0.078	0.109		0.015		68	34
19	0.861	0.000	0.000	0.045	0.078	0.109		0.015		68	34
20	0.861	0.000	0.000	0.045	0.078	0.109		0.015		68	34
21	0.861	0.000	0.000	0.045	0.078	0.109		0.015		68	34
22	0.861	0.000	0.000	0.045	0.078	0.109		0.015		68	34
23	0.861	0.000	0.000	0.045	0.078	0.109		0.015		68	34
24	0.861	0.000	0.000	0.045	0.078	0.109		0.015		68	34
25	0.861	0.000	0.000	0.045	0.078	0.109		0.015		68	34
26	0.861	0.000	0.000	0.045	0.078	0.109		0.015		68	34
27	0.861	0.000	0.000	0.045	0.078	0.109		0.015		68	34
28	0.861	0.000	0.000	0.045	0.078	0.109		0.015		68	34
SUM	17.220	-	0.951	0.823	7.263	9.556	N.A.	0.717	N.A.	-	-
AVG	0.615	6	0.034	0.029	0.259	0.341	N.A.	0.026	N.A.	68	26
NBS	Q4C2	N400	Q4C0	Q403	Q401		Q410	Q415	Q417	N406	N113

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT ENVIRONMENTAL SUMMARY

SITE: J.D. EVANS, INC. HOUSE B, COLUMBIA, MARYLAND
REPORT PERIOD: FEBRUARY, 1979
SOLAR/1013-79/02

DAY OF MONTH	TOTAL INSOLATION BTU/SQ.FT	DIFFUSE INSOLATION BTU/SQ.FT	AMBIENT TEMPERATURE DEG F	DAYTIME AMBIENT TEMP DEG F	RELATIVE HUMIDITY PERCENT	WIND DIRECTION DEGREES	WIND SPEED M.P.H.
1	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
2	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
3	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
4	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
5	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
6	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
7	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
8	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
9	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
10	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
11	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
12	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
13	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
14	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
15	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
16	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
17	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
18	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
19	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
20	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
21	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
22	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
23	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
24	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
25	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
26	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
27	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
28	*****	NOT APPLICABLE	*****	*****	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
SUM	25906	N.A.	-	-	-	-	-
AVG	925	N.A.	26	29	N.A.	N.A.	N.A.
NBS ID	Q001		N113			N115	N114

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
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SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT THERMODYNAMIC CONVERSION EQUIPMENT

SITE: J.D. EVANS, INC. HOUSE B, COLUMBIA, MARYLAND SOLAR/1013-79/02
REPORT PERIOD: FEBRUARY, 1979

DAY OF MONTH	EQUIPMENT LOAD MILLION BTU	THERMAL ENERGY INPUT MILLION BTU	OPERATING ENERGY MILLION BTU	ENERGY REFLECTED MILLION BTU	COEFFICIENT OF PERFORMANCE (SEE NOTE)
1	*	*	NOT APPLICABLE	NOT APPLICABLE	*
2	*	*	NOT APPLICABLE	NOT APPLICABLE	*
3	*	*	NOT APPLICABLE	NOT APPLICABLE	*
4	*	*	NOT APPLICABLE	NOT APPLICABLE	*
5	*	*	NOT APPLICABLE	NOT APPLICABLE	*
6	*	*	NOT APPLICABLE	NOT APPLICABLE	*
7	*	*	NOT APPLICABLE	NOT APPLICABLE	*
8	*	*	NOT APPLICABLE	NOT APPLICABLE	*
9	*	*	NOT APPLICABLE	NOT APPLICABLE	*
10	*	*	NOT APPLICABLE	NOT APPLICABLE	*
11	0.754	0.456	NOT APPLICABLE	NOT APPLICABLE	2.347
12	0.685	0.419	NOT APPLICABLE	NOT APPLICABLE	2.380
13	0.826	0.455	NOT APPLICABLE	NOT APPLICABLE	2.672
14	0.806	0.414	NOT APPLICABLE	NOT APPLICABLE	2.597
15	0.632	0.414	NOT APPLICABLE	NOT APPLICABLE	1.695
16	0.671	0.325	NOT APPLICABLE	NOT APPLICABLE	1.500
17	0.620	0.326	NOT APPLICABLE	NOT APPLICABLE	1.466
18	0.247	0.144	NOT APPLICABLE	NOT APPLICABLE	2.571
19	0.355	0.163	NOT APPLICABLE	NOT APPLICABLE	7.750
20	0.270	0.122	NOT APPLICABLE	NOT APPLICABLE	7.648
21	0.424	0.192	NOT APPLICABLE	NOT APPLICABLE	7.058
22	0.361	0.158	NOT APPLICABLE	NOT APPLICABLE	10.306
23	0.498	0.218	NOT APPLICABLE	NOT APPLICABLE	14.171
24	0.531	0.239	NOT APPLICABLE	NOT APPLICABLE	10.639
25	0.485	0.219	NOT APPLICABLE	NOT APPLICABLE	17.287
26	0.423	0.105	NOT APPLICABLE	NOT APPLICABLE	10.287
27	14.338	7.643	*	*	6.032
28	0.512	0.273	*	*	3.133
SUM					0.112
AVG					

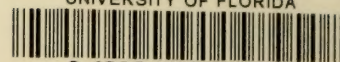
* DENOTES UNAVAILABLE DATA.

@ DENOTES NULL DATA.

N.A. DENOTES NOT APPLICABLE DATA.

NOTE:

UNIVERSITY OF FLORIDA



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